5(4) SOV/69-21-4-1/22

AUTHOR: Bakanov, S.P. and Deryagin, B.V.

TITLE: On the Theory of Thermoprecipitation of High Dispersion Aerosol Systems.

PERIODICAL: Kolloidnyy zhurnal, 1959, Vol XXI, Nr 4, pp 377-384 (USSR)

ABSTRACT: This is a study of thermoprecipitation of high dispersion aerosol systems, in which the measures (δ) of the suspended particles are considerably smaller than the medium length (λ) of the free run of the gas molecules ($\delta_1 \ll \lambda$). Under atmospheric pressure, this corresponds quantitatively to aerosol particles of 10^{-6} cm and less in size. The authors consider this high dispersion aerosol system, in which a small temperature gradient is maintained, as a mixture of two gases (in reality it is a mixture of gas and dust). The separation of the mixture, therefore, is carried out through the separation of two gases by thermal diffusion. The study of the authors is divided into two parts. In the first they determine the rate of movement of the particles with regard to the center of gravity of the to-

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On the Theory of Thermoprecipitation of High Dispersion Aerosol Systems.

tal of gas molecules. For this purpose, they use the Chapman-Enskog formula(1), which was obtained as a result of the solution of the Bolzmann ("Bol'tsman") kinetic equation. An equation (12) shows that the rate of thermal precipitation $\vec{u}$ does not depend on the dimensions of the particles. It is inversely proportional to the square root of medium temperature and gas pressure. The magnitude u holds for atmospheric pressure, T (absolute temperature) = 300° C and grad T = 30°C/cm for air of the category 0.25 mm/sec. The authors observe that Einstein obtained a similar formula (13), the coefficient of which is approximately threefold smaller than that of the authors' formula. In the second part of the article, the authors approach the problem with another method analogous to that which was used by them for the solution of a problem concerning diffusional particle transport. This method consists in the computation of the resultant force, by which an unevenly-heated gas acts on a suspended particle. The use of this method resulted in the ascertainment of a well-regulated additional velocity compo-

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nent $\vec{u}$ (equations (41) and (42)) of a suspended particle, which does not noticeably disturb the velocity distribution of the gas molecules. The velocity component $\vec{u}$, which has to be added to the velocity of the Brownian movement, is due to the effect of the collision of the molecules. The magnitude of $\vec{u}$ is proportional to the value of grad T, inversely proportional to the gas pressure and also to the square root of medium temperature and molecular weight of the gas. It does not depend on the dimensions of the particle. The numerical value of thermophoretic velocity depends, under the assumption of stability of the other conditions, in the character of interaction of gas molecules and particle surface. This velocity is identical (if the absolute velocity values are preserved) during elastic and diffusional reflection of the molecules and by $\sim$ 25% less in the case of diffusional dispersion of the molecules. There are 4 references, 2 of which

On the Theory of Thermoprecipitation of High Dispersion Aerosol Systems.

are German, 1 Soviet and 1 English.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR, Moskva (Institute of Physical Chemistry of the AS USSR, Moscow).

SUBMITTED: 15 July 1958.

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S/020/60/135/006/025/037
B004/B056

11.7410

AUTHORS: Deryagin, B. V., Corresponding Member AS USSR, Bakanov, S. P., and Kurgin, Yu. S.

TITLE: The Influence of Monomolecular Layers Upon the Evaporation of Drops

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 6, pp. 1417 - 1420

TEXT: The authors develop a theory of the influence of monomolecular layers upon the evaporation of drops, which takes two effects into account: 1) the quasi-steady evaporation of a drop covered by an insoluble film of a different substance, and 2) the nonsteady evaporation of a drop covered by such a film. For 1) the following is taken into account: a) the steady diffusion of liquid molecules through the film, b) the steady diffusion of liquid molecules from the film into the air. The following relations are written for these processes: $C_1 = A_1/r + B_1$; $a < r < a + \delta$; $C_2 = A_2/r + B_2$; $r > a + \delta + \lambda$. C_1 denotes the number of liquid molecules

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The Influence of Monomolecular Layers Upon the Evaporation of Drops

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per cm^3 of film, C_2 the concentration of vapor in the air, a the radius of the drop, δ the thickness of the film, λ the thickness of the layer of air immediately adjoining the film. A_1, A_2, B_1, B_2 are coefficients. On the basis of the boundary conditions for diffusion on the boundaries $r = a + \delta$ and $r = a + \delta + \lambda$ the following relation is derived for a film ($\delta \ll a$): $-dM/dt = 4\pi a^2 (C_0 - C_\infty) / \left[C_0 \delta / C_p D_1 + 1/(\alpha \bar{v}/4) + a^2/(a+\lambda) D_2 \right]$ (10). dM/dt is the change in mass of the drop per unit time, C_0 is the saturation concentration of vapor at the temperature of the drop, C_p is the concentration of the liquid in the drop, C_∞ is the concentration of vapor at an infinite distance from the drop, α is the permeability coefficient of the film, D_1 is the diffusion coefficient of the liquid in the film, D_2 is the diffusion coefficient of vapor in air, and $\bar{v}$ is the average velocity of the vapor molecules. For the case $C_0 \delta / C_p D_1 + 1/(\alpha \bar{v}/4) < 1/(\alpha_{H_2O} \bar{v}/4)$, where $\alpha_{H_2O} = 0.034$ is the condensation coefficient of water, there results

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an acceleration of evaporation by the presence of the monomolecular layer. This case was experimentally observed. For nonsteady evaporation, the authors proceed from the equation $-dM/dt = m4\pi(a+\lambda)^2(-D_2\partial C/\partial r|_{r=a+\lambda})$, and derive a very voluminous equation. For the initial evaporation rate, $J|_{t=0} = J_0\left[1 + (\bar{v}/4)a^2/D_2(a+\lambda)\right]$ is given. J_0 corresponds to the quasi-steady state of equation (10). On the basis of the experimental values of J_0 and $J_{t=0}$, the parameters α and δ/CD_1 may be calculated for each film. There are 7 references: 4 Soviet and 3 US.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences USSR)

SUBMITTED: July 14, 1960

BAKANOV, S.P

42

PHASE I BOOK EXPLOITATION SOV/5590

Konferentsiya po poverkhnostnym silam. Moscow, 1960.

Issledovaniya v oblasti poverkhnostnykh sil; sbornik dokladov na konferentsii po poverkhnostnym silam, aprel' 1960 g. (Studies in the Field of Surface Forces; Collection of Reports of the Conference on Surface Forces, Held in April 1960) Moscow, Izd-vo AN SSSR, 1961. 231 p. Errata printed on the inside of back cover. 2500 copies printed.

Sponsoring Agency: Institut fizicheskoy khimii Akademii nauk SSSR.

Resp. Ed.: B. V. Deryagin, Corresponding Member, Academy of Sciences USSR; Editorial Board: N. N. Zakhavayeva, N. A. Krotova, M. M. Kusakov, S. V. Nerpin, P. S. Prokhorov, M. V. Talayev and G. I. Fuks; Ed. of Publishing House: A. L. Bankvitser; Tech. Ed.: Yu. V. Rylina.

PURPOSE: This book is intended for physical chemists.

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Studies in the Field of Surface Forces (Cont.) SOV/5590

COVERAGE: This is a collection of 25 articles in physical chemistry on problems of surface phenomena investigated at or in association with the Laboratory of Surface Phenomena of the Institute of Physical Chemistry of the Academy of Sciences USSR. The first article provides a detailed chronological account of the Laboratory's work from the day of its establishment in 1935 to the present time. The remaining articles discuss general surface force problems, polymer adhesion, surface forces in thin liquid layers, surface phenomena in dispersed systems, and surface forces in aerosols. Names of scientists who have been or are now associated with the Laboratory of Surface Phenomena are listed with references to their past and present associations. Each article is accompanied by references.

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Studies in the Field of Surface Forces (Cont.) SOV/5590

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B102/B138

5.4400

AUTHORS: Bakanov, S. P., Deryagin, B. V.

TITLE: Behavior of small aerosol particles in an unevenly heated gas mixture

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 17, 1961, 79, abstract 17B601 (Sb. "Issled. v. obl. poverkhnostn. sil." M., AN SSSR, 1961, 202 - 208)

TEXT: A theory developed in previous papers (RZhKhim, no. 17, 56965; 1960, no. 3, 8548) is applied to the case of small aerosol particles near evaporating or growing drops. The formulas derived are too cumbersome for general analysis. Calculation is made for the case of a CCl_4 drop in He atmosphere. In this case there should be inversion of the velocity of the motion of the particle: at an environmental temperature of $T \gg 300^{\circ}K$ the evaporating drop will attract the aerosol particles, and at $T \leq 277^{\circ}K$ it will repel them, and vice versa for a growing drop. This is due to the presence of two gaseous components in the temperature field. [Abstracter's note: Complete translation.]

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BAKANOV, S.P.; RUKHADZE, A.A.; SANDOMIRSKIY, V.B.

Theory of the expansion of a gas bubble in a viscous liquid.
Inzh.fiz.zhur. 4 no.7:109-112 Jl '61. (MIRA 14:8)

1. Institut fizicheskoy khimii AN SSSR, Moskva.
(Bubbles)

DERYAGIN, B.V.; BAKANOV, S.P.

Concerning priority in the development of the theory of diffusiophoresis and thermophoresis of small aerosol particles. Koll.zhur. 23 no.4:505-507 Jl-Ag '61. (MIRA 14:8)

1. Institut fizicheskoy khimii AN SSSR, Moskva.
(Aerosols)

25477
S/020/61/139/001/009/018
B104/B231

24.4300

AUTHORS: Bakanov, S. P., and Deryagin, B. V., Corresponding Member of the AS USSR

TITLE: State of a gas moving in the neighborhood of a solid surface

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 1, 1961, 71 - 74

TEXT: For the purpose of investigating an even gas flow, bounded on one side by a wall, the authors apply methods developed by E. P. Gross et al. (Ann. of Phys. (USA), 1, 141 (1957); Phys. of Fluids, 1, 215 (1958). For reasons of simplicity, diffuse reflection from the wall is assumed as gas-kinetic boundary condition. The distribution function of the gas molecules in the boundary layer satisfies the Boltzmann equation, and is found as follows: $f = f_0\{1 + \Phi(\vec{c}, x)\}$ (1). $\vec{c} = (m/2kT)^{1/2}\vec{v}$; $\vec{v}$ stands for the velocity of a molecule, m for its mass; T is the absolute temperature, x the perpendicular distance of the molecule from the wall.
$f_0 = n(m/2\pi kT)^{3/2}\exp(-c^2)$. The correction Φ in the steady state is found

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State of a gas moving in the...

by solving the equation $c_x \partial\Phi/\partial x = J(\Phi)$ (2) where $J(\Phi)$ is the collision integral. The gas outside the boundary layer displays a Chapman-Enskog distribution which can be put down as follows:
$f = f_o(1 + mv_z q_z/kT - b_1 mv_z v_x \partial q_z/2kTn\partial x)$. q_z stands here for the center-of-mass velocity of the gas, n for the number of molecules per unit volume, b_1 for a constant that depends on the interaction of gas molecules. As regards solid spheres the following applies: $b_1 = \frac{5}{4}\sqrt{\pi n\lambda}(m/2kT)^{1/2}$. Two suitable distribution functions are introduced for f:
$f(\vec{v},x) = f^+(\vec{v},x) + f^-(\vec{v},x)$ for $v_x < 0$ and $v_x > 0$, respectively; $f^+ = 0$ for $v_x < 0$, and vice versa. By introducing the denotation $u_z(x) = (m/2kT)^{1/2} q_z(x)$, $l = \frac{5}{4}\sqrt{\pi\lambda}$ and transition to dimensionless velocities the author obtains as boundary condition:

$$\Phi^-(\vec{c},d) = 2c_z u_z(d) - lc_x c_z \frac{\partial u_z}{\partial x}(d), \quad \Phi^+(\vec{c},0) = 0 \quad (3)$$

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and the solution of (2) with the boundary conditions (3) is subsequently found in the form $\overset{\mp}{\Phi}\pm(\vec{c},x) = a_0^{\pm}(x)c_z + a_1^{\pm}(c_x c_z)$ (3) is satisfied on the condition that $a_0^{+}(0) = 0$, $a_1^{+}(0) = 0$, $a_0^{-}(d) = 2u_z(d)$, $a_1^{-}(d) = -1\partial u_z(d)/\partial x$. Thus $\overset{\mp}{\Phi}$ can be expressed by

$$\Phi = \Phi^{+}\frac{1+\operatorname{sign} c_x}{2} + \Phi^{-}\frac{1-\operatorname{sign} c_x}{2} =$$

$$= \left(\frac{a_0^{+}+a_0^{-}}{2} + \frac{a_1^{+}+a_1^{-}}{2}c_x\right)c_z + \left(\frac{a_0^{+}-a_0^{-}}{2} + \frac{a_1^{+}-a_1^{-}}{2}c_x\right)c_z \operatorname{sign} c_x. \quad (6)$$

and, since $J(\overset{\mp}{\Phi})$ is a linear operator the following applies

$$J(\Phi) = \frac{a_0^{+}+a_0^{-}}{2}J(c_z) + \frac{a_1^{+}+a_1^{-}}{2}J(c_x c_z) +$$

$$+\frac{a_0^{+}-a_0^{-}}{2}J(c_z \operatorname{sign} c_x) + \frac{a_1^{+}-a_1^{-}}{2} + J(c_x c_z \operatorname{sign} c_x). \quad (7)$$

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State of a gas moving in the...

In addition,

$$\frac{d}{dx}\left(\pm a_0^{\pm} + a_1^{\pm}\frac{\sqrt{\pi}}{2}\right) = \pm\frac{a_1^+ + a_1^-}{\pi} I_2 \pm \frac{a_0^+ - a_0^-}{\pi} I_1,$$
$$\frac{d}{dx}\left(a_0^{\pm}\frac{\sqrt{\pi}}{2} \pm a_1^{\pm}\right) = \frac{a_0^+ - a_0^-}{\pi} I_2 + \frac{a_1^+ + a_1^-}{\pi} I_3 \pm \frac{a_1^+ - a_1^-}{\pi} I_4, \quad (8)$$

where

$$I_1 = \int_{-\infty}^{\infty} c_x \operatorname{sign} c_x J(c_x \operatorname{sign} c_x) e^{-c^2}\vec{dc}, \qquad I_2 = \int_{-\infty}^{\infty} c_x J(c_x c_x) e^{-c^2}\vec{dc},$$
$$I_3 = \int_{-\infty}^{\infty} c_x c_x J(c_x c_x) e^{-c^2}\vec{dc}, \quad I_4 = \int_{-\infty}^{\infty} c_x c_x \operatorname{sign} c_x J(c_x c_x \operatorname{sign} c_x) e^{-c^2}\vec{dc}. \quad (9)$$

is obtained for the determination of $a_0^{\pm}(x)$ and $a_1^{\pm}(x)$. Further similar expressions are vanishing. If the kind of molecule interaction is given, integrals (9) can be computed. For solid spheres the author obtains:

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$I_2 = -\frac{4}{5\sqrt{\pi}}\frac{\pi}{\lambda} \approx -0.452\frac{\pi}{\lambda}$, $I_3 = -0.4\frac{\pi}{\lambda}$, and, furthermore,

$$a_0^+ = l\frac{\partial u}{\partial x}(d)\left(2\frac{x}{l} + \frac{B}{C}e^{-\alpha x} - \frac{B}{C}\right),$$
$$a_0^- = l\frac{\partial u}{\partial x}(d)\left(2\frac{x}{l} + \frac{A}{C}e^{-\alpha x} - \frac{B}{C}\right), \qquad (17)$$
$$a_1^+ = l\frac{\partial u}{\partial x}(d)(e^{-\alpha x} - 1), \quad a_1^- = l\frac{\partial u}{\partial x}(d)\left(-\frac{D}{C}e^{-\alpha x} - 1\right).$$

$$q(x) = \frac{1}{n}\int_{-\infty}^{\infty} v_z f d\vec{v} = \frac{1}{8}\bar{v}\left[\sqrt{\pi}(a_0^+ + a_0^-) + (a_1^+ - a_1^-)\right], \qquad (18)$$

is obtained for the velocity profile of the gas near the wall, where $\bar{v} = (8kT/\pi m)^{1/2}$. Substituting (17) into (18) finally results in

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$$q(x)=\frac{1}{8}\bar{v}l\frac{\partial u}{\partial x}\left[\sqrt{\pi}\left(4\frac{x}{l}-2\frac{B}{C}+\frac{A+B}{C}e^{-\alpha x}\right)+\left(1+\frac{D}{C}\right)e^{-\alpha x}\right]= \quad (A)$$
$$=\frac{2\eta}{\pi\rho\bar{v}}\frac{\partial q}{\partial x}(d)\left[\sqrt{\pi}\left(4\frac{x}{l}-2\frac{B}{C}\right)+\left(\frac{A+B}{C}\sqrt{\pi}+1+\frac{D}{C}\right)e^{-\alpha x}\right].$$

while

$$p_{xz}^{+}(x)=-\frac{1}{2}\eta\frac{\partial q}{\partial x}\left[1-\frac{B_1(\pi-2)}{\alpha\sqrt{\pi}+\pi B_1}e^{-\alpha x}\right], \quad (B)$$
$$p_{xz}^{-}(x)=-\frac{1}{2}\eta\frac{\partial q}{\partial x}\left[1+\frac{B_1(\pi-2)}{\alpha\sqrt{\pi}+\pi B_1}e^{-\alpha x}\right].$$

is obtained for the pulse components. The denotations used in these equations are as follows: $A = \alpha\sqrt{\pi} - 4B_1$; $B = -\alpha\sqrt{\pi} - 4B_1$; $C = 2(\alpha + B_1\sqrt{\pi})$; $D = 2(-\alpha + B_1\sqrt{\pi})$; $A_1 = (I_1 - \frac{1}{2}\sqrt{\pi}I_2)/(1 - \pi/4)\pi$; $B_1 = (I_2 - \frac{1}{2}\sqrt{\pi}I_1)/\pi(1-\pi/4)$; $A_2 = (I_2 - \frac{1}{2}\sqrt{\pi}I_3)/\pi(1 - \pi/4)$; $B_2 = (I_3 - \frac{1}{2}\sqrt{\pi}I_2)/\pi(1 - \pi/4)$; $A_3 = \frac{1}{2}\sqrt{\pi}I_4/\pi(1 - \pi/4)$; $B_3 = I_4/\pi(1 - \pi/4)$.

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B104/B231

State of a gas moving in the...

There are 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences USSR)

SUBMITTED: March 25, 1961

Card 7/7

DERYAGIN, B.V.; BAKANOV, S.P.

Theory of gas sliding along a solid surface under the effect of temperature drop. Dokl. AN SSSR 141 no.2:384-386 N '61.
(MIRA 14:11)

1. Chlen-korrespondent AN SSSR (for Deryagin).
(Gas flow)

DERYAGIN, Boris Vladimirovich; BAKANOV, S. P.

"Present state of the theory of thermophores and diffusiophoresis of aerosol particles "
To be presented at the First National Conference on Aerosols - Liblice, Czechoslovakia, 8-13 Oct 1962

Inst. of Physical Chemistry, Acad. of Sci. USSR, Moscow

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S/020/62/144/003/012/030
B102/B108

AUTHORS: Deryagin, B. V., Corresponding Member AS USSR, and Bakanov, S.P.

TITLE: Theory of thermomolecular pressure drop and of thermo-osmosis of gases in wide capillaries

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 3, 1962, 535-537

TEXT: Within the framework of the thermodynamics of irreversible processes the authors study the possible causes of the inconsistency of the theory of thermomechanical effects (Maxwell, Phil. Trans. Roy. Soc., 170, p. 1,231, 1879; Epstein, Zs. Phys., 54, 539, 1929) and the experimental results. The Poiseuille gas current through a cylindrical tube is considered, assuming that the main part of heat is transferred not in the layer near the wall but in the bulk of the gas. This assumption is based on results of earlier studies (DAN, 141, No. 2, 1961). The system considered consists of two vessels connected by a wide tube with the differences Δp and ΔT between its ends. The flows of mass and heat are then

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$$I_M = - L_{11} \frac{\Delta p}{\rho T} - L_{12} \frac{\Delta T}{T^2},$$

$$I_Q = - L_{21} \frac{\Delta p}{\rho T} - L_{22} \frac{\Delta T}{T^2} \qquad (2)$$

with $\Delta p/\Delta T = -I_Q/I_M \Big|_T (\rho/T)$. $I_Q\Big|_T$ is the flow of heat at constant temperature, which can be set equal to $(3/2)\eta\nu\pi r^2\Delta\vec{v}$, and $\Delta\vec{v} = (1/\eta)$ grad p (Navier-Stokes) if the gas is incompressible and thought to consist of elastic balls. η denotes the dynamic viscosity of the gas. The heat transfer in the layer near the wall is $I'_Q\Big|_T = k\nu\pi r^2$grad p, k = 0.0218..., so that the total heat transferred in the gas is $I_Q\Big|_T + I'_Q\Big|_T = 1.52\nu\pi r^2$grad p. The flow of mass is $I_M\Big|_T = (-\pi r^4/8\nu)$grad p, so that

Theory of thermomolecular pressure ...

$$\frac{\Delta p}{\Delta T} = \frac{12,2\eta v}{r^2 T} = 12,2\,\frac{\eta^2 R}{pMr^2} \qquad (9)$$

M is the molecular weight and R the gas constant. This formula describes the sought thermomolecular effect in wide capillaries. If the temperature dependence of η is taken into account, this relation agrees with experimental results. There is 1 figure.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences, USSR)

SUBMITTED: February 28, 1962

Card 3/3

42546

S/020/62/147/001/019/022
B101/B144

27,4000

AUTHORS: Deryagin, B. V., Corresponding Member AS USSR, Bakanov, S. P.

TITLE: Theory of the thermophoresis of large solid aerosol particles

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 1, 1962, 139 - 142

TEXT: On the basis of the thermodynamics of irreversible processes, the rate of thermophoresis of an aerosol particle is studied for the case $R \gg \lambda$ where R is the particle radius, λ is the mean free path of the gas molecules flowing around the particle under isothermal conditions. The material flow is $I_{M|p} = (\varrho/T)Q|_T \Delta T/\Delta p$, from which $v = (Q|_T/T)\Delta T/\Delta p$ is obtained. To calculate $Q|_T$ it is assumed that a spherical particle is flown around by the gas at small Reynolds numbers. According to Chapman-Enskog, and allowing for the Navier-Stokes relations, the following expression is obtained: $Q = (3/2)(\eta/\varrho)dp/d\vec{r}$ where $Q_{r|r=R} = (9/2)(\eta^2/\varrho R^2)(\vec{u}\cdot\vec{r}) = (\vec{\alpha}\cdot\vec{r}_0)$ holds for the surface of the sphere. $\vec{u}$ is the gas velocity at infinity, $\vec{r}_0$ is the unit vector in the direction $\vec{r}$. $T_i = -(\vec{\alpha}\cdot\vec{r})/2\varkappa_e + \varkappa_i)$

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B101/B144

Theory of the thermophoresis...

holds for the temperature distribution within the sphere. Outside the sphere $T_e = -(\overrightarrow{\alpha r})/(2\varkappa_e + \varkappa_i)$ where $\varkappa_i$ is the thermal conductivity of the sphere, $\varkappa_e$ that of the gas. If $\varkappa_i \gg \varkappa_e$, then according to P. Epstein (Zs. Phys., 54, 537 (1929)) $Q|_T = -(\eta/2\varrho)\overline{dp}/dz$ from which it follows that $v = -(\eta/2\varrho T)\overline{dT}/dz$. If $\varkappa_i$ is of the same order of magnitude as $\varkappa_e$, the velocity of thermophoresis is expressed by $v_T = [(4\varkappa_e + 0.5\varkappa_i)/(2\varkappa_e + \varkappa_i)](\eta/\varrho T)dT/dz$. The experimental data are better expressed by this equation than by that of P. Epstein. It also explains the experimentally observed dependence of $\varrho v_T/\eta$ on the nature of the gas. There is 1 figure.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences USSR)

SUBMITTED: July 20, 1962

Card 2/2

L 58402-65 EWT(d)/EWT(l)/EEC(k)-2/EPF(n)-2/EWG(m)/EEC-4/EPA(w)-2/EEC(t) Pn-4/
Pz-6/Po-1/Pab-10/Pg-4/Pt-7/Pi-4/Pl-4 IJP(c) WW/AT/WS-4
ACCESSION NR: AP5016560 UR/0056/65/048/006/1656/1668

AUTHOR: Bakunov, S. P.; Rukhadze, A. A. 90 B

TITLE: Excitation of electromagnetic waves in plasma media in an external electric field

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 6, 1965, 1656-1668

TOPIC TAGS: plasma, plasma oscillation, electromagnetic wave, electromagnetic field, plasma conductivity, anomalous Doppler effect

ABSTRACT: Excitation of low-frequency electromagnetic waves in a [illegible]
volving the collision integral introduced by Davydov (ZhETF, v. 7, 1937, p. 1069). The dispersion equation for small oscillations is analyzed in detail. It is shown that [illegible] drift velocities exceed the phase velocity of the wave parallel to the drift. In this case buildup of the oscillations is due to the change in the sign of the high-

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L 58403-65

ACCESSION NR: AP5016560

frequency plasma conductivity under conditions of the anomalous Doppler effect. On the other hand, transverse electromagnetic waves are excited at arbitrarily small electron drift velocities, i.e., at arbitrarily small currents in the plasma. Under the conditions considered, only transverse oscillations can arise in the electron-hole plasma of a solid body. The oscillation increments and frequencies are found and conditions for oscillation buildup are given. Orig. art. has: 42 formulas.

[CS]

ASSOCIATION: none

SUBMITTED: 06Jan65 ENCL: 00 SUB CODE: EM, ME

NO REF SOV: 011 OTHER: 004 ATD PRESS: 4042

Card 2/2

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ACC NR: AP6004872 SOURCE CODE: UR/0057/66/036/001/0007/0012

82
81
D

AUTHOR: Bakanov, S.P.; Rukhadze, A.A.

ORG: Physics Institute im. P.N.Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

21, 44, 55

TITLE: On the oscillations of a plasma in constant external electric and magnetic fields

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 1, 1966, 7-12

TOPIC TAGS: plasma stability, electric field, semiconductor plasma, plasma oscillation, constant magnetic field, ionized plasma, electron plasma, electromagnetic wave oscillation, propagation velocity

ABSTRACT: The authors (ZhETF, 48, 1656, 1965) have previously discussed the excitation under the influence of a constant electric field of low frequency electromagnetic oscillations in a weakly ionized electron-ion plasma and in the electron-hole plasma of a semiconductor. In the present paper they consider the influence on these oscillations of a strong external magnetic field parallel to the electric field. [Abstracter's note: The results and notation of the previous paper are employed without redefinition of the symbols; it is accordingly difficult to follow the argument without reference to the earlier paper] It is shown that the magnetic field does not stabilize the noise oscillations that arise in arbitrarily weak electric fields. It

Card 1/2 UDC: 533.9

L 21678-66

ACC NR: AP6004872

is found that in a plasma having unequal numbers of carriers of the two signs there can arise drift waves with a propagation velocity close to the drift velocity. Conditions for the stability of these waves are derived and it is shown that these conditions depend on the longitudinal dimension of the plasma. This phenomenon can be employed to design a semiconductor microwave amplifier. The authors also discuss the influence of the magnetic field on the stability of the waves propagating transversely to the drift at a velocity considerably exceeding the drift velocity, the possible existence of which they demonstrated in the earlier paper. The authors thank V.M.Levin for discussing the results and for critical remarks. Orig. art. has: 17 formulas.

SUB CODE: 20/ SUBM DATE: 10May65/ ORIG REF: 006/ OTH REF: 000

Card 2/2 dda

L 11419-67 EWT(1) IJP(c)
ACC NR: AP6031267 SOURCE CODE: UR/0057/66/036/009/1639/1648

AUTHOR: Bakanov,S.P.; Bogdankevich,L.S.; Rukhadze,A.A. 50 49

ORG: Physics Institute im. P.N.Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: On the excitation of electromagnetic oscillations in a plasma beam bounded by plane conducting walls

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 9, 1966, 1639-1648

TOPIC TAGS: plasma stability, plasma oscillation, plasma electromagnetic wave, plasma magnetic field, betatron, uhf amplifier, extreme high frequency

ABSTRACT: The authors discuss the stability of a plasma uniformly filling most of the space between two plane parallel conducting walls and carrying an electron current in the direction of an applied magnetic field that is parallel to the walls. The calculations were undertaken because of their practical interest in connection with negative absorption amplifiers and plasma betatrons. The walls were assumed to be plane and parallel to facilitate the calculations; it is presumed that the results are qualitatively valid for the technically interesting case of a plasma beam in a cylindrical enclosure with conducting walls. The calculations are based on a dielectric tensor derived by linearizing hydrodynamic equations for the electron motion, which include the self consistent field and the effects of collisions. The calculations are therefore valid for waves whose phase velocities are high compared with the electron thermal

Card 1/2 UDC: 533.9

L 11419-67

ACC NR: AP6031267

velocities. Dispersion equations are derived for the limiting cases of weak and strong external magnetic field, and the logarithmic increments of the oscillations are calculated. It is found that in a rarefied plasma in a weak magnetic field there develops a periodic convective instability that is carried by the electron current, and that such a system can amplify. The instability persists in a weakly ionized dense plasma, in which collision effects are predominant, and a strong external longitudinal magnetic field reduces the logarithmic increment in a collision-free plasma but does not stabilize it. The frequency band that can be amplified increases in width with increasing wall conductivity, but the length of the tube required for a given gain also increases. It is concluded that the optimum wall conductivity for a negative absorption amplifier is 10^{13} or 10^{14} sec^{-1} and the optimum plasma density is such as to provide a collision frequency of 10^{12} or 10^{13} sec^{-1}. Under these conditions frequencies up to about 10^{12} Hz can be amplified. It is found that under the conditions of the plasma betatron experiments of A.M.Stefanovskiy (Yadernyy sintez, 5, 215, 1965), the instability discussed here develops during the course of several microseconds. This time is much longer than the observed acceleration times and is also longer than the time that would be required for acceleration of the electrons if the acceleration were not interrupted. It is therefore concluded that the instability associated with wall conductivity cannot explain the observed interruption of acceleration in the plasma betatron and will not in itself prevent the operation of such an accelerator. The authors thank V.P.Silin, who instigated the work. Orig. art. has: 31 formulas and 1 figure.

SUB CODE: 20 SUBM DATE: 28Jun65 ORIG. REF: 006 OTH REF: 001

Card 2/2 bab

ACC NR: AP6036027 SOURCE CODE: UR/0057/66/036/011/1955/1958

AUTHOR: Bakanov, S. P.; Lovetskiy, Ye. Ye.

ORG: Moscow Institute of Physics and Engineering (Moskovskiy inzhenerno-fizicheskiy institut)

TITLE: Theory of the instability of current plasma confined between conducting walls

SOURCE: Zhurnal technicheskoy fiziki, v. 36, no. 11, 1966, 1955-1958

TOPIC TAGS: plasma, current plasma, unstable plasma, ~~unstable current~~ plasma instability

ABSTRACT: A study is made of the effect of conducting walls on the stability of charge plasma in relation to the buildup of potential fluctuations. High-conductivity metal walls greatly reduce the instability region of charge plasma. This results in a considerable reduction in the accelerating electrical field necessary for "slipping through" the unstable region. A buildup of surface waves is possible on the boundary between the charge plasma and vacuum. It is shown that in the

UDC: 533.9

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ACC NR: AP6036027

presence of conducting walls this instability can be stabilized, which indicates that conducting walls substantially ease the conditions of unimpeded electron acceleration in a plasma betatron. [Authors' abstract] [SP]

SUB CODE: 20/SUBM DATE: 13Dec65/ORIG REF: 004/OTH REF: 001/

Card 2/2

TEREKHOV, A.A., kand. tekhn. nauk; BAKANOV, V.I., inzh.; LOZINSKIY, V.N., inzh.; OZHIGOV, Yu.S., inzh.

New self-dumping motorcar. Vest. TSNII MPS 18 no.7:53-56 N '59. (MIRA 13:2)

(Mine railroads)

POTAPOV, V.S., inzh.; BAKANOV, V.I., inzh.

Results of the testing of the industrial 26E1 electric locomotive.
Vest.TSNII MPS 22 no.6:35-39 '63. (MIRA 16:10)

ASHKENAZI, Yefrem Abramovich, kand. tekhn. nauk; BAKANOV, Vladimir Ivanovich, inzh.; PETROVA, V.L., red.; VOROTNIKOVA, L.F., tekhn. red.

[Fields of application of the various types of traction in industrial railroad transportation]. Sfery primeneniia razlichnykh vidov tiagi na promyshlennom zheleznodorozhnom transporte. Moskva, Transzheldorizdat, 1963. 133 p. (Moscow. Vsesoiuznyi nauchno-issledovatel'skii institut zheleznodorozhnogo transporta. Trudy, no.263).

(MIRA 16:4)

(Railroads, Industrial) (Locomotives)

BAKANOV, V. N.

"Increase in the Food Value of Grass Mixtures and Succulent Fodders by Means of Advanced Agricultural Techniques." Cand Agr Sci, Moscow Agricultural Acad, Moscow, 1953. (RZhBiol, No 4, Oct 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (10)

So: Sum. No. 481, 5 May 55

Q-1

USSR/Farm Animals - General Problems.

Abs Jour : Ref Zhur - Biol., No 1, 1959, 2621

Author : Lakanov, V.N.

Inst : Moscow Agricultural Academy imeni K.A. Timiryazen

Title : Increasing the Protein Nutritiveness of Green Fodder by Altering Agricultural Techniques.

Orig Pub : Dokl. Mosk. s.-kh. akad. im. K.A. Timiryazeva, 1957, vyp. 30, ch. 2, 27-33.

Abstract : The effect of the supplementation of the nutrition of the germination of vetch-grain mixtures with mineral fertilizers upon their chemical composition and nutritiveness was studied. The introduction of phosphate and nitrogenous fertilizers increased the content of protein and phosphate compounds in green fodder. The green part of the forage plants assimilated 58% of the nitrogen introduced

Card 1/2

- 6 -

MULLER, Zdenek; BAKANOV, N.A. [translator]; BAKANOV, V.N., red.

[Antibiotics in the feeding of farm animals] Antibiotiki v kormlenii sel'skokhoziaistvennykh zhivotnykh. Pod red. V.N.Bakanova. Moskva, Izd-vo inostr.lit-ry, 1958. 184 p. Translated from the Czech. (MIRA 14:1)
(Antibiotics) (Feeding)

BAKANOV, V.N., kand.sel'skokhozyaystvennykh nauk, starshiy nauchnyy sotrudnik

Effect of clutivation practices on the content of protein, calcium, and phosphorus in vetch-oat mixtures [with summary in English]. Izv. TSKhA no.4:56-68 '60. (MIRA 13:9)
(Vetch) (Oats) (Tillage)

BAKANOV, V.N., dotsent, kand. sel'skokhoz. nauk; KUZYURIN, A.N., zasluzhennyy agronom RSFSR; MAMAYEV, V.A., aspirant

Use of corn silage in intensified dairying. Izv. TSKHA no.5: 178-196 '64. (MIRA 18:5)

1. Kafedra kormleniya sel'skokhozyaystvennykh zhivotnykh Moskovskoy ordena Lenina sel'skokhozyaystvennoy akademii imeni Timiryazeva. 2. Direktor uchebno-opytnogo khozyaystva imeni Kalinina, Michurinskogo rayona, Tambovskoy oblasti, Moskovskoy ordena Lenina sel'skokhozyaystvennoy akademii imeni Timiryazeva (for Kuzyurin).

GORBOV, V.F.; ZOLOTUKHIN, Ye.S.; BAKANOV, Ye.D.; NOVIKOV, G.S.

Automatic machines for superfinishing ball races. Suggestion by V.F. Gorbov and others. Prom.energ. 11 no.7:16-17 Jl '56. (MLRA 9:10)

(Ball bearings) (Metalworking machinery)

CHULIN, V.M.; BAKANOV, Ye.I.

Pressure-drop signal indicator with explosion protection.
Transp. i khran. nefti i nefteprod. no.4 35-36 '64
(MIRA 17:7)

1. Spetsial'noye konstruktorskoye byuro "Transneft' avtomatika".

BAKANOVA, A., zamestitel' predsedatelya.

Struggle for metal. Rabotnitsa 31 no.7:6-7 Jl '53. (MLRA 6:6)

1. Zavkom Moskovskogo avtomobil'nogo zavoda imeni Stalina.
(Metal industries)

SOV/20-121-1-17/55

AUTHORS: Al'tshuler, L. V., Bakanova, A. A., Trunin, R. F.

TITLE: Phase Transformations When Water Is Compressed by Strong Shock Waves (Fazovyye prevrashcheniya pri szhatii vody sil'nymi udarnymi volnami)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 1, pp. 67-69 (USSR)

ABSTRACT: This paper gives a report on the shock-like compression of water in the range of pressures from 20 000 to 800 000 atmospheres. On this occasion the kinematic parameters of the shock wave, namely, its velocity of propagation D and mass velocity U of matter behind the wave front, were measured. Because of the laws of conservation of mass and momentum these parameters are connected with the density of the shock-like compression $\varrho = \varrho_0 D/(D - U)$ and with the pressure $P = \varrho_0 DU$; ϱ_0 denotes the density of matter before the compression. The method of investigation can be simplified very much when the shock wave is lead to the layer of the substance to be investigated through shields of a material with known

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SOV/20-121-1-17/55

Phase Transformation When Water Is Compressed by Strong Shock Waves

Hugoniot (Gyugonio) adiabatic line of the shock compression. The quantities measurable by experiment are the speed of the shock waves in the shield and in water. The dynamical adiabatic line of water consists of two sections which with their ends fix the region of phase transition. The existence of the phase transition is also proved by the decrease in transparency of water when a shock wave of sufficiently high amplitude of pressure $P > P_1$ goes through. In the case of shock waves with an amplitude of pressure $P < P_1$ the transparency does not change. There are 4 figures and 5 references, 1 of which is Soviet.

PRESENTED: January 17, 1958, by Yu. B. Kharitonov, Member, Academy of Sciences, USSR

SUBMITTED: November 26, 1957

1. Water--Pressure 2. Water--Properties 3. Phase transitions 4. Shock waves--Velocity 5. Shock waves--Physical effects

Card 2/2

82415

S/056/60/038/03/14/033
B006/B014

24.5300

AUTHORS: Al'tshuler, L. V., Kormer, S. B., Bakanova, A. A., Trunin, R. F.

TITLE: Equation of State for Aluminum, Copper, and Lead in the High-pressure Range

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 3, pp. 790-798

TEXT: In the present paper, the authors discuss the conclusions applying to aluminum, copper, and lead, as result from an equation deviating from the Mie - Grueneisen solid-state equation. The equation considered by the authors deviates in that it holds within a wide pressure- and temperature range, and that the thermal electron components of energy and pressure are taken into account. Moreover, data are furnished concerning dynamic compression of aluminum up to pressures of 2.10^6 atm, and results of new measurements of the compressibility of copper, lead, and iron at 10^6, 2.10^6, and 4.10^6 atm are offered. Numerous theoretical and experimental details concerning the adiabatics of these three metals are discussed in the introduction, with special regard to the collision adiabatics (Ye. I. Zababakhin, Yu. F.

Card 1/3

Equation of State for Aluminum, Copper, and Lead in the High-pressure Range

S/056/60/038/03/14/033
B006/B014

Alekseyev). Ansatzes for the equation of state and internal energy have the form $P = P_{int} + P_{therm} + P_{exc}$ and $E = E_{int} + E_{therm} + E_{exc}$ (2). The first terms of these sums characterize the interaction of atoms at 0°K, the second terms are thermal ones determined by lattice vibrations, and the third terms are determined by the thermal excitations of electrons. In the following, the various terms are written down explicitly; and finally, the following explicit expressions are obtained for pressure and temperature:

$P = P_{int} + \frac{\gamma_p C_{vp}}{v}\left[T-T_o+E_o/C_{vp}\right] + \frac{1}{4}\rho_o\beta_o (v_o/v)^{1/2}T^2$ and

$E = \int_{v}^{v_{ok}} P_{int}dv + E_o + C_{vp}(T-T_o) + \frac{1}{2}\beta_o(v/v_o)^{1/2}T^2$. According to equation (1) for the dynamic adiabatics $P_G = \sum a_k(\sigma - 1)^k$, dynamic experiments permitted a determination of pressure P_G and also of energy $E_G = E_o + \frac{1}{2}P_G(v_o - v)$. Results of computations for aluminum are given in Table 5, for copper in Table 6, and for lead in Table 7. As is shown by Figs. 1 and 2, thermal

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Equation of State for Aluminum, Copper, and Lead in the High-pressure Range

S/056/60/038/03/14/033
B006/B014

pressure plays an important part in the compression of metals by strong shock waves. For the pressures 216.10^{10} bars (Al), 388.10^{10} bars (Cu), and 401.10^{10} bars (Pb), the thermal pressure components amounted to 59.10^{10}, 115.10^{10}, and 124.10^{10} bars. For the same pressures, the thermal energy component was 57% (Al), 60% (Cu), and 69% (Pb). Finally, the authors thank A. I. Funtikov, R. V. Malyshev, and I. P. Dudoladov, as well as Professor K. A. Semendyayev for their assistance, advice, and discussions. L. D. Landau is also mentioned in this article. There are 2 figures, 7 tables, and 14 references, 4 of which are Soviet.

SUBMITTED: October 7, 1959

Card 3/3

18.8100 1418 1402 1530
24.7500 1144, 1160, 1482, 2108
1.1210 2808, 3008, 3108

26693
S/056/61/041/005/008/038
B109/B102

AUTHORS: Al'tshuler, L. V., Kormer, S. B., Bakanova, A. A., Petrunin, A. P., Funktikov, A. I., Gubkin, A. A.

TITLE: Irregular conditions of oblique collision of shock waves in solids

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 5(11), 1961, 1382 - 1393

TEXT: On the basis of papers by V. Blikney, A. Taub (Sb. Voprosy raketnoy tekhniki, 1, 1951), L. D. Landau, Ye. M. Lifshits (Mekhanika sploshnykh sred - Mechanics of Continuous Media, Gostekhizdat, 1954), O. S. Ryzhov, S. A. Khristianovich (PMM, 22, 586, 1958), Ya. B. Zel'dovich, Gandel'man, and Ye. A. Feoktistova (DAN SSSR, 136, 1325, 1961) the authors describe a method of producing and recording irregular conditions for the collision of shock waves in solids. The experimental arrangement is shown in Fig. 2a. The detonation waves which enter the specimen at a slant cause shock waves with amplitudes of between 3 and 4 . 10^5 atm. Another arrangement allowed reaching shock waves of 1 - 1.8 . 10^6 atm. The parameters of the

Card 1/3

Irregular conditions of oblique ....

three-shock configuration forming as a result of the collision of the shock waves, are given for aluminum, lead, iron, and copper bodies. Near the critical angle at which a shock wave can still arise pressure was found to rise by from 6 to 8 times. When the waves have greater amplitudes, pressure in the collision region rises up to $4 \cdot 10^6$ atm in aluminum. In steel, copper, and lead it may even reach $7 \cdot 10^6$ atm if the waves collide at right angles. The results are analyzed by means of the method of the impact polars. It is shown that the picture with only one tangential discontinuity cannot be employed in describing the irregular conditions of the oblique collision of weak shock waves in the metal. The authors present a method of determining pressure and density behind the reflected wave front from the parameters of the three-shock configuration. Pressure and density for the collision of strong shock waves in aluminum were calculated as examples. It was found that the incident and reflected waves increase the density of aluminum up to 6.12 g/cm^3. M. P. Speranskaya, N. S. Tenigin (deceased), A. N. Kolesnikova, M. S. Shvetsov, L. N. Gorelova, and M. V. Sinitsyn are thanked for assistance and information. There are 14 figures, 3 tables, and 9 Soviet references.

SUBMITTED: May 18, 1961
Card 2/3

34000
S/056/62/042/001/015/048
B104/B102

18.8100

AUTHORS: Al'tshuler, L. V., Bakanova, A. A., Trunin, R. F.

TITLE: Shock adiabats and zero isotherms of seven metals at high pressures

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, 1962, 91-104

TEXT: The wave velocity D and the mass velocity U behind the shock-wave front were measured in Fe, Ni, Cu, Zn, Cd, Sn, and Pb. Pressure and degree of compression were determined from $P = \rho_0 DU$ and $\sigma = D/(D-U)$. By passing from the shock adiabat to the zero isotherm, the following simple equations were obtained for pressure and energy:

$$P_x(\delta) = Q\,[\delta^{7/6}\exp\{q(1-\delta^{-1/3})\} - \delta^{7/6}],$$

$$E_x(\delta) = (3Q/\rho_{0k})\,[q^{-1}\exp\{q(1-\delta^{-1/3})\} - \delta^{1/3}]$$

where Q and q are unknown constants, $\delta = v_0/v$, v being the specific volume,

Card 1/53

Shock adiabats and zero isotherms...

and $v_o = v$ at $P = 0$ and $T = T_o$. In the case of ionic compounds, the first terms in (5) determine the ionic repulsion potential and the second terms determine the Coulomb attraction. In the case of metals, the positive and the negative term in (5) express the repulsive and the attractive forces, respectively. Similar equations were obtained for transition metals in the same way. Shock adiabats and zero isotherms were approximated by a suitable combination of Q and q (Figs. 5 and 6). Using the equation $P_{x,extra} = b + B(\sigma - a)^n$, the zero isotherms were extrapolated into pressure and density ranges, to which quantum statistical methods are applicable. The extrapolation constants are presented in Table 8.
K. K. Krupnikov, M. I. Brazhnik (ZhETF, 34, 886, 1958), S. B. Kormer, V. D. Urlin, L. T. Popova (FTT, 3, 223, 1961), V. S. Zharkov, and V. A. Kalinin (DAN SSSR, 135, 811, 1960) are mentioned. V. N. Zubarev is thanked for his assistance in interpreting experimental data, M. I. Brazhnik, A. A. Gubkin, and I. P. Dudoladov for their help in experiments and calculations, and S. B. Kormer and V. D. Urlin for discussions. There are 9 figures, 8 tables, and 14 references:

Card 2/3

34000
S/056/62/042/001/015/048
B104/B102

Shock adiabats and zero isotherms...

9 Soviet-bloc and 5 non-Soviet-bloc. The four most recent references to English-language publications read as follows: R. G. McQueen, S. P. Marsh. J. Appl. Phys. 31, 1253, 1960; J. M. Walsh et al. Phys. Rev. 108, 196, 1957; J. J. Gilvarry. Phys. Rev. 102, 317, 1956; J. S. Dugdale, D. K. McDonald. Phys. Rev., 89, 832, 1953.

SUBMITTED: August 10, 1961

Table 1. Experimental results. Legend: (1) shock-wave parameters.

Table 2. Experimental results. Legend: (1) material of impact mass; (2) velocity of impact mass.

Table 8. Extrapolation constants.

Fig. 5. Shock adiabats and zero isotherms of Ni and Zn.

Fig. 6. Shock adiabats and zero isotherms of Fe.

Card 3/5 3

BAKANOVA, A.A.

AID Nr. 971-19 20 May

IMPACT COMPRESSIBILITY OF Ti, Mo, Ta, and Fe (USSR)

Krupnikov, K. K., A. A. Bakanova, M. I. Brazhnik, and R. F. Trunin. IN: Akademiya nauk SSSR. Doklady, v. 148, no. 6, 21 Feb 1963, 1302-1305.
S/020/63/148/006/012/023

The impact compressibility of Ti, Mo, and Ta at pressures up to $5 \cdot 10^6$ atm, and of Fe at a pressure of ~ $9 \cdot 10^6$ atm, has been determined. The pressure was generated by shooting aluminum plates at a velocity of 5600 m/sec or steel pins at a velocity of 8640 or 9100 m/sec onto test specimens 3-4 mm thick which were shielded by an Al or Fe shield. The pressure and the degree of compression were calculated from the experimentally determined velocity D of the shock wave. The state of impact compression and the values of pressure P and mass velocity behind the front of shock wave U were determined graphically. The compression density ρ was calculated from the equation $\rho_0 D = \rho(D-U)$, where ρ_0 is the initial density. From the obtained shock-wave parameters the adiabatic curves for shock waves and zero isotherms were calculated and plotted.

[MS]

Card 1/1

L 55117-65 EWT(1)/EWP(m)/EWT(m)/EWA(d)/[illegible]

ACCESSION NR: AP[illegible] UR/0181/65/007/006/1615/1622

AUTHOR: Bakanova, A. A.; Dudoladov, [illegible]; Trunin, R. F.

TITLE: Compression of alkali metals by [illegible] shock waves

SOURCE: Fizika tverdogo tela, v. 7, no. 6, 1965, 1615-1622

TOPIC TAGS: shock compression, lithium, sodium, potassium, zero isotherm, compression curve, alkali metal, shock wave

ABSTRACT: The shock compressibility of Li, Na, and K were investigated in the pressure range 30—950 kbar, using plexiglas as a standard. The experiments were carried out with the set-up shown in Fig. 1 of the Enclosure, the samples being cylinders 12 and 16 mm in diameter and 4 or 6 mm high. The pressures and the densities of the shock compression were determined by a reflection method described by [illegible] Al'tshuler et al. (ZhETF v. [illegible]) by registering the velocities of the shock waves in the investigated and in the control samples of aluminum or plexiglas. At maximum shock-wave amplitudes the greatest increase in density was noted in K (by a factor of 2.45 as against [illegible] in Li and Na). The compression curves at absolute zero are derived on the basis of the experimental data. The

Card 1/3

ACCESSION NR: AP5014552

curves obtained are compared with the previously proposed plots of P. Combes (the

SUBMITTED: 20Dec64 ENCL: 01 SUB CODE:

REF SOV: 009 OTHER: 013

L 32210-66 EWT(1)/EWP(m) WW SOURCE CODE: UR/0386/66/003/012/0483/0487
ACC NR: AP6020795 (A)

68
65
B

AUTHOR: Al'tshuler, L. V.; Bakanova, A. A.; Dudoladov, I. P.

ORG: none

TITLE: Peculiarities of shock compression of lanthanides

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 12, 1966, 483-487

TOPIC TAGS: lanthanide series, lanthanum, cerium, samarium, dysprosium, erbium, second order phase transition, adiabatic compression, high pressure, critical pressure, mechanical shock resistance

ABSTRACT: The authors report the first results of an investigation of the dynamic compressibility of La, Ce, Sm, Dy, and Er up to 3.5 Mbar pressure. The shock-compression parameters were obtained by the reflection method (L. V. Al'tshuler, Uspekhi fiz. nauk v. 85, 197, 1965 and earlier) using apparatus described elsewhere (ZhETF v. 38, 790, 1960 and Fiz. tverdogo tela v. 5, 279, 1963). The directly measured quantities were the velocities d of the shock wave in the investigated metals. These were used to determine the mass velocities u, the shock compression pressures P, and the degrees of compression σ. The d-u plot of each of the lanthanides, obtained from the experimental data, is represented with high

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accuracy by two straight-line segments of different slopes. The slopes and intercepts of all the segments are determined and tabulated. The shock adiabats were also plotted for Sm, Dy, and Er, for which the change in slope of the d-u plot was most pronounced. The adiabats exhibit kinks near the critical pressures, indicating the presence of a second-order phase transition. The more gently sloping sections of the adiabats are probably determined by the compression of the external low-density 6S shells and by the simultaneously occurring redistribution of the electrons among the bands. The change in slope at the critical pressure signifies the completion of these processes and the formation of low-compressibility electronic configuration. A more complete interpretation of the data calls for calculation of the energy spectra of the compressed metals.
The authors thank Corresponding Member of the Academy of Sciences SSSR, Professor N. P. Sazhin, as well as Engineers L. A. Dolomanov and V. M. Murav'yeva for interest and collaboration. Orig. art. has: 2 figures, 2 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 25Apr66/ ORIG REF: 008/ OTH REF: 003

ACCESSION NR:

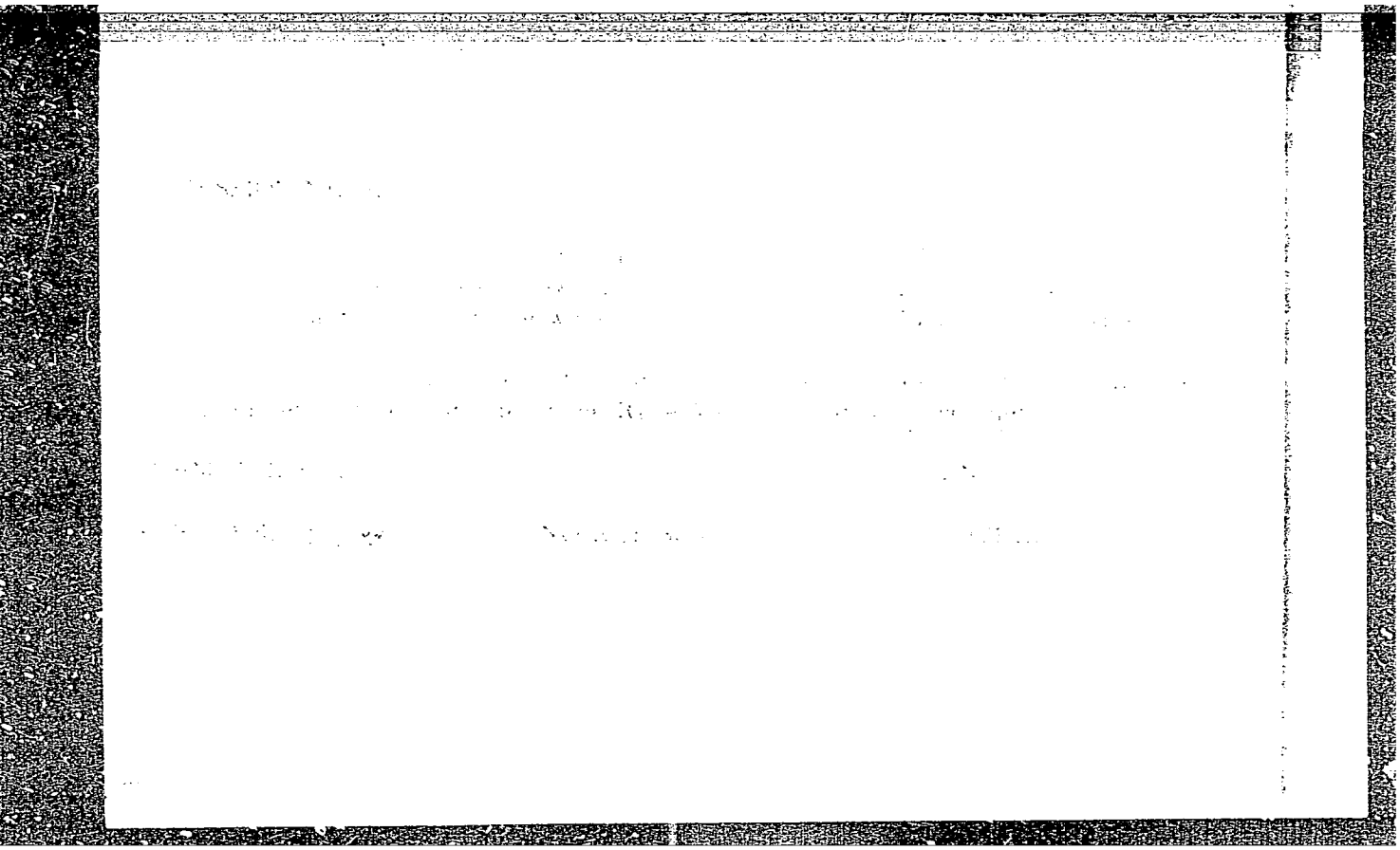
AUTHOR: [illegible]

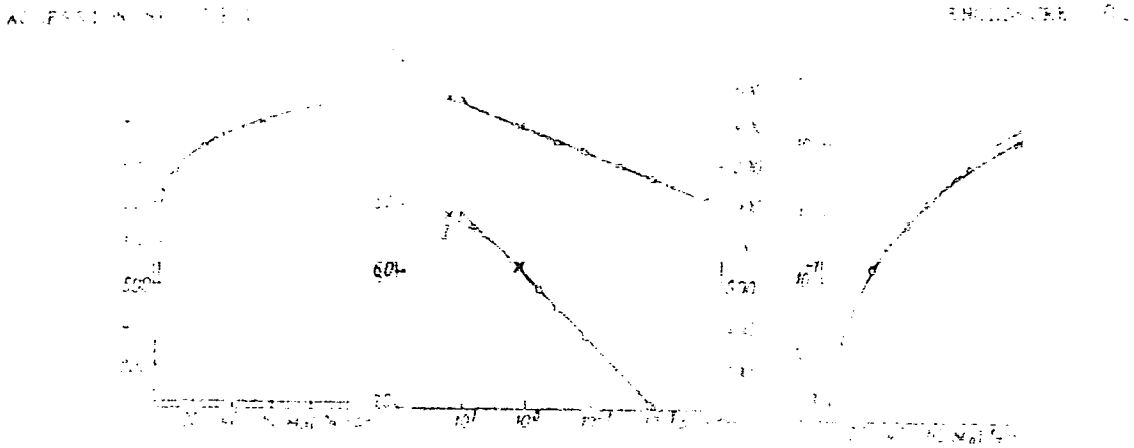
SOURCE: Zhurnal [illegible] 1964, 551-555

TOPIC TAGS: [illegible]

ABSTRACT: The gallium-gallium phosphide system was studied, and the temp-

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103030001-3"

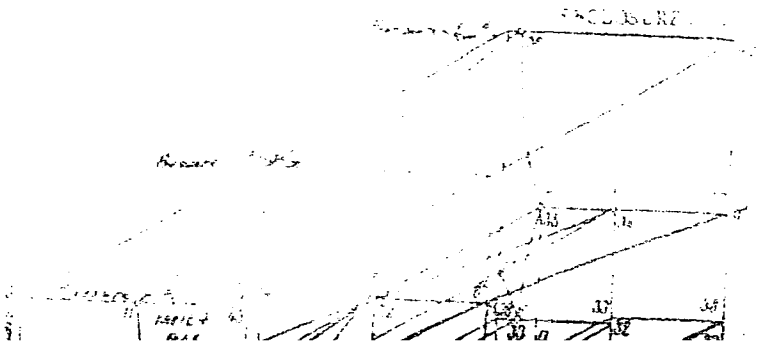




1- 10.5 atm. 2-16.2 atm.(L. I. Marina, A. Ya. Nashel'skiy, S. V. Yakobson,

Card 3/4

diagram of the gallium-



FIRGANG, Yevgeniy Vladimirovich; BAKANOVA, I.P., red.

[Electrostatics. Direct current; lectures in physics] Elektrostatika. Postoiannyi elektricheskii tok; lektsii po fizike. Moskva, Mosk. poligraficheskii in-t, 1961. 100 p.
(MIRA 16:9)

(Electrostatics) (Electric currents)

GENKEL', P.A.; BAKANOVA, L.V.; SAMYGIN, G.A.

Freezing of plants with a low frost resistance. Fiziol.rast. 12 no.1:69-75 Ja-F '65. (MIRA 18:3)

1. Institut fiziologii rasteniy imeni Timiryazeva AN SSSR, Moskva.

GENKEL', P.A.; BAKANOVA, L.V.

Surface characteristics of the cell protoplasts of plants in the state of dormancy. Fiziol.rast. 12 no.4:659-664 Jl-Ag '65. (MIRA 18:12)

1. Institut fiziologii rasteniy imeni K.A.Timiryazeva AN SSSR, Moskva. Submitted March 31, 1965.

BAKANOVA, M. I., Engr

"An Investigation of the Relation of the Productivity of a Dredge to the Operation of Washing-Concentrating Equipment." Cand Tech Sci, Moscow Inst of Nonferrous Metals and Gold imeni M. I. Kalinin, 29 Nov 54. (VM, 16 Nov 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (11)

SO: Sum. No. 521, 2 Jun 55

BAKANOVA, N.P.

LEBEDEV, D.D.; BAKANOVA, N.P.

Cutaneous reaction with diphthorial toxin in determining diphtherial immunity. Zhur.mikrobiol.epid. i immun.28 no.12:54-55 D '57. (MIRA 11:4)

1. Iz kliniki detskikh infektsiy II Moskovskogo meditsinskogo instituta im. N.I. Pirogova.

(CORYNEBACTERIUM DIPHTHERIAE,
toxin, cutaneous reaction in immun. determ (Rus)

17(8);(12) SOV/16-59-9-4/47

AUTHORS: Bakanova, N.P., and Apanashchenko, N.I.

TITLE: Determining the Susceptibility of Children to Diphtheria by the Skin Method. II. Using Purified Stabilized Toxin for the Skin Test

PERIODICAL: Zhurnal mikrobiologii, epidemiologii i immunobiologii, 1958, Nr 9, pp 19-22 (USSR)

ABSTRACT: In Part I of this work the authors published the findings of their investigations into the susceptibility of children to diphtheria, determined by the skin method and performing the Schick test at the same time. Here, in Part II, the authors describe the effect of using purified diphtheria toxin with a glycerine-gelatine stabilizer, prepared according to the method evolved by P.V. Pavlov and A.G. Leonova at the Institut imeni Gamalei (Institute imeni Gamaleya). Some 357 children aged from 6 months to 13 years were vaccinated and kept under observation. Both the skin test and the Schick test were used. It was found that the coincidence in the results of the two tests increased directly with an increase in the concentration of the diphtheria toxin. At a concentration of 100 Dlm/ml the coincidence reached 98.8%. This was much better than when unpurified toxin was used. The method

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Determining the Susceptibility of Children to Diphtheria by the Skin Method. II. Using Purified Stabilized Toxin for the Skin Test

was found to be quite harmless for children. The purified stabilized diphtheria toxin retained its specific action on animals for 2 years. The authors recommend further work on the efficacy and practical advisability of this method.
There are 2 tables, 1 graph and 3 Soviet references.

ASSOCIATION: Kafedra detskikh infektsionnykh bolezney II Moskovskogo meditsinskogo instituta imeni Pirogova (Chair of Children's Infectious Diseases of the II Moscow Institute imeni Pirogov); Institut epidemiologii i mikrobiologii imeni Gamalei AMN SSSR (Institute of Epidemiology and Microbiology imeni Gamaleya of the AMN USSR)

SUBMITTED: February 25, 1959

BAKANOVA, N.P., APANASHCHENKO, N.I.

Skin test in determination of susceptibility of children to diphtheria. Zhur.mikrobiol. epid. i immun. 29 no.6:38-43 Je '58 (MIRA 11:7)

1. Iz kafedry detskikh infektsionnykh bolezney II Meditsinskogo instituta imeni Pirogova i Instituta epidemiologii i mikrobiologii imeni Gamalei AMN SSSR.
(DIPHTHERIA, immunology,
skin test in determ. of susceptibility (Rus))

BAKULEV, A.N., akademik, glav. red.; ZAVALISHIN, N.I., prof., zam. glav. red.; TIMAKOV, V.D., prof., zam. glav. red.; IL'ICHEVA, K.I., starshiy nauchnyy red.; OBYSOVA, Ye.S., starshiy nauchnyy red.; PAVLOVA, A.A., starshiy nauchnyy red.; BAKANOVA, T.D., nauchnyy red.; GRISHINA, L.A., starshiy tekhn. red.

[Large medical encyclopedia]Bol'shaia meditsinskaia entsiklopediia. Glav. red. A.N.Bakulev. Moskva, Gos. nauchn. izd-vo "Sovetskaia entsiklopediia." Vol.26. Poroshki - professional'-nyi otbor. Izd.2. 1962. 1256 columns. [List of articles and terms for the letter "P" (26th vol.).]Perechen' statei i terminov na bukvu "P" (dvadtsat' shestoi tom) 4 p. [Phonograph record for the article "Heart defects" (Aortal defects of the heart)]Gramofonnaia plastinka k stat'e "Poroki serdtsa" (Aortal'nye poroki serdtsa). (MIRA 15:10)

(MEDICINE--DICTIONARIES)

BAKULEV, A.N., akademik, glav. red.; ZAVALISHIN, N.I., prof., zam. glav. red.; TIMAKOV, V.D., prof., zam. glav. red.; IL'ICHEVA, K.I., starshiy nauchnyy red.; OBYSOVA, Ye.S., starshiy nauchnyy red.; PAVLOVA, A.A., starshiy nauchnyy red.; BAKANOVA, T.D., nauchnyy red.; LEBEDEVA, A.K., red.; GRISHINA, L.A., tekhn. red.

[Large medical encyclopedia]Bol'shaia meditsinskaia entsiklopediia. Glav.red. A.N.Bakulev. Moskva, Gos.nauchn. izd-vo "Sovetskaia entsiklopediia." Vol.27. Profilaktika - Reverden. Izd.2. 1962. 1224 columns. ___ [List of articles and terms for the letters "P" and "R"]Perechen' statei i terminov na bukvy "P" i "R" (dvadtsat' sed'moi tom) 4 p. ___[Phonorecord appended to the article "Heart defects" (Combined heart defects)]Gramofonnaia plastinka k stat'e "Poroki serdtsa" (Kombinirovannye poroki serdtsa). Vol.28. Revmatizm - Rumyniia. Izd.2. 1962. 1248 columns. ___[List of articles and terms for the letter "R"]Perechen' statei i terminov na bukvu "R" (dvadtsat' vos'moi tom) 4 p. ___ [Phonorecord appended to the article "Phychogenia"] Gramofonnaia plastinka k stat'e "Psikhogenii" (psikhogennye psikhozy) (MIRA 15:12)

(MEDICINE--DICTIONARIES)

SOKOLOVA, N.I.; BAKANOVA, V.A.; SHABAROVA, Z.A.; PROKOF'YEV, M.A.

Isolation of pyrimidine deoxyribonucleosides and the production of their aminoacyl derivatives. Biokhimiia 27 no.6:1079-1084 N-D '62. (MIRA 17:5)

1. Laboratoriya khimii belka Gosudarstvennogo universiteta imeni Lomonosova, Moskva.

SOKOLOVA, N.I.; BAKANOVA, V.A.; SHABAROVA, Z.A.; PROKOF'YEV, M.A.

Aminoacyl derivatives of nucleosides. Part 6: Synthesis and properties of aminoacyl derivatives of deoxyribonucleosides. Zhur. ob. khim. 33 no.8:2480-2486 Ag '63. (MIRA 16:11)

BAKANOVA, V.V., assistent

Accuracy of relief mappings on 1:2000 maps prepared by stereotopographic surveying. Izv. vys. ucheb. zav.; geod. i aerof. no.4:75-81 '63. (MIRA 17:9)

1. Moskovskiy institut inzhenerov geodezii, aerofotos"yemki i kartografii.

SOV/153-2-4-29/32

5(1,3), 3o(1)

AUTHORS: Berlin, A. A., Bakanova, Ye. G.

TITLE: Production of Stable Emulsions, Having a Washing Effect, From DDT

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 4, pp 622 - 625 (USSR)

ABSTRACT: The use of aqueous dispersions of insecticides in various branches of industry, agriculture, and medicine has been increasing (Ref 1). In this connection, the discovery of economical production methods for stable emulsions, of DDT solutions in petroleum, and other solvents with washing properties in addition to highly insecticide effects has become necessary. In order to solve this problem, the authors tested the following emulsifiers and stabilizers: polyethylene-glycol esters of alkyl phenols (OP-4, OP-7, OP-1o, OP-2o, etc), moreover, emulsifiers produced from protein waste, technical starch, sulfite lyes, oxyethyl- and carboxymethyl cellulose, sodium alginate, the diethyl-aminomethyl-derivative salt of alkyl-phenol-polyethylene-glycol ester (equalizer A). Among the stabilizers mentioned, water-soluble keratin (keratein) is

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especially interesting. Figure 1 characterizes the surface activity of the emulsifiers investigated. Hence it appears that the most active ones are: OP-4, OP-7 and keratein (dissolution product of waste containing keratin in 3-10% sodium-sulfide solutions, or in 1-3% alkali solutions at 60-80°,Ref 2). Table 1 shows the effect of the addition of OP-4 to keratein on the properties of the emulsions (turpentine in water). Hence it appears that the stability and emulsifying capacity of keratein rapidly increase by a 0.1 to 0.01% OP-4 addition. Comparatively highly disperse, stable emulsions are formed. They did not dissociate into layers, even after a three-month storage (Fig 2). In order to obtain maximum homogenization of the emulsification of DDT-solutions, they were put into an ultrasonic field. The best results were obtained with a frequency of 20-300 kilocycles (Ref 3). The emulsions were sufficiently stable (Fig 3). The washing capacity was tested by means of artificially soiled cotton samples in hard water for 20 minutes. The rinsed and dried samples were photometrically recorded. Tables 2 and 4 show the results. Thus, the addition of OP-4 to keratein increases the stabilizing effect

Production of Stable Emulsions, Having a Washing Effect, From DDT SOV/153-2-4-29/32

as well as the foam-forming capacity of the protein. The same emulsifier rendered possible the production of concentrated aqueous stable suspensions of DDT- or hexachlorocyclohexane solutions in turpentine with a content of active substance of 60-65%, 20-25% of fatty acids in soaps may be substituted by keratein. Soaps thus modified have a higher foam-formation- and washing capacity. Thus, considerable amounts of edible fats can be obtained from the soap industry, and can be used for consumption. There are 4 figures, 2 tables, and 5 Soviet references.

ASSOCIATION: Moskovskiy tekhnologicheskiy institut myasnoy i molochnoy promyshlennosti; Laboratoriya vysokomolekulyarnykh soyedineniy (Moscow Technological Institute of Meat and Milk Industry, Laboratory of High-molecular Compounds)

SUBMITTED: June 11, 1958

Card 3/3

BAKANOVA, Z. M.

Chem

Organic insectofungicides. XVIII. New method of preparation of esters of chloro- and dichlorothiophosphoric acids. Z. M. Bakanova, Ya. A. Mandel'baum, N. N. Mel'nikov, and E. I. Sventsitskii. *Zhur. Obshchei Khim.* 26, 494-5(1956); cf. *C.A.* 50, 2415d.—Refluxing fine Al wire in 2–4 fold excess of abs. EtOH in the presence of 0.1 g. $Hg(OAc)_2$ and a little iodine for activation of Al, until all Al goes into soln. results in a rapid prepn. of $Al(OEt)_3$. With an equimolar amt. of EtOH, C_6H_6 is used as a diluent and the reaction is much slower. To 17 g. $PSCl_3$ there was added with cooling a soln. from 0.5 g. Al and 3 g. EtOH in 8 ml. C_6H_6; after 3 hrs. at 50° the mixt. was washed with ice-H_2O acidified with HCl, dried, and distd., yielding 40% $EtOPSCl_2$, b_{23} 68°, d_4^{20} 1.3968, n_D^{20} 1.5030. To 34 g. $PSCl_3$ was added with cooling a soln. from 2 g. Al and 25 ml. EtOH; after 2 hrs. at 50–60° the cooled mixt. was washed with cold H_2O acidified with HCl, yielding 42% $(EtO)_2PSCl$, b_{23} 96–8°, d_4^{20} 1.2015, n_D^{20} 1.4670. XIX. Synthesis of mixed esters of dithiophosphoric acid containing an amide group in the aliphatic ester radical. K. D. Shvetsova-Shilovskaya, N. N. Mel'nikov, and N. I. Martem'yanova. *Ibid.* 496–8.—Appropriate aldehydes and esters of carbamic acid were mixed and treated with $(RO)_2PS_2H$; after standing 1–3 days at room temp. the products were extd. with C_6H_6, washed with H_2O, dried and distd. No other details are given. Thus were prepd.: $(RO)_2P(S)SCH_2NR'CO_2R''$ (R, R', R'', % yield, b.p., d_{20}, and n_D^{20} given): *Me, H, Et*, 38.3, $b_{0.2}$ 107–10°, 1.3498, 1.5091; *Et, H, Et*, 42, $b_{0.03}$ 64–8°, 1.1904, 1.4990; *Pr, H, Et*, 60.7, $b_{0.03}$ 82°, 1.0866, 1.4912; *iso-Bu, H, Et*, 46.6, $b_{0.175}$ 122–4°, —, — (m. 22°); *Et, Me, Et*, 20.8, $b_{0.13}$ 107–14° 1.1814, 1.5041; *Bu, Me, Et*, 53.7, $b_{0.4}$ 145–52°, 1.0675, 1.4870; *iso-Bu, Me, Et*, 67.5, $b_{0.1}$ 124–7°,

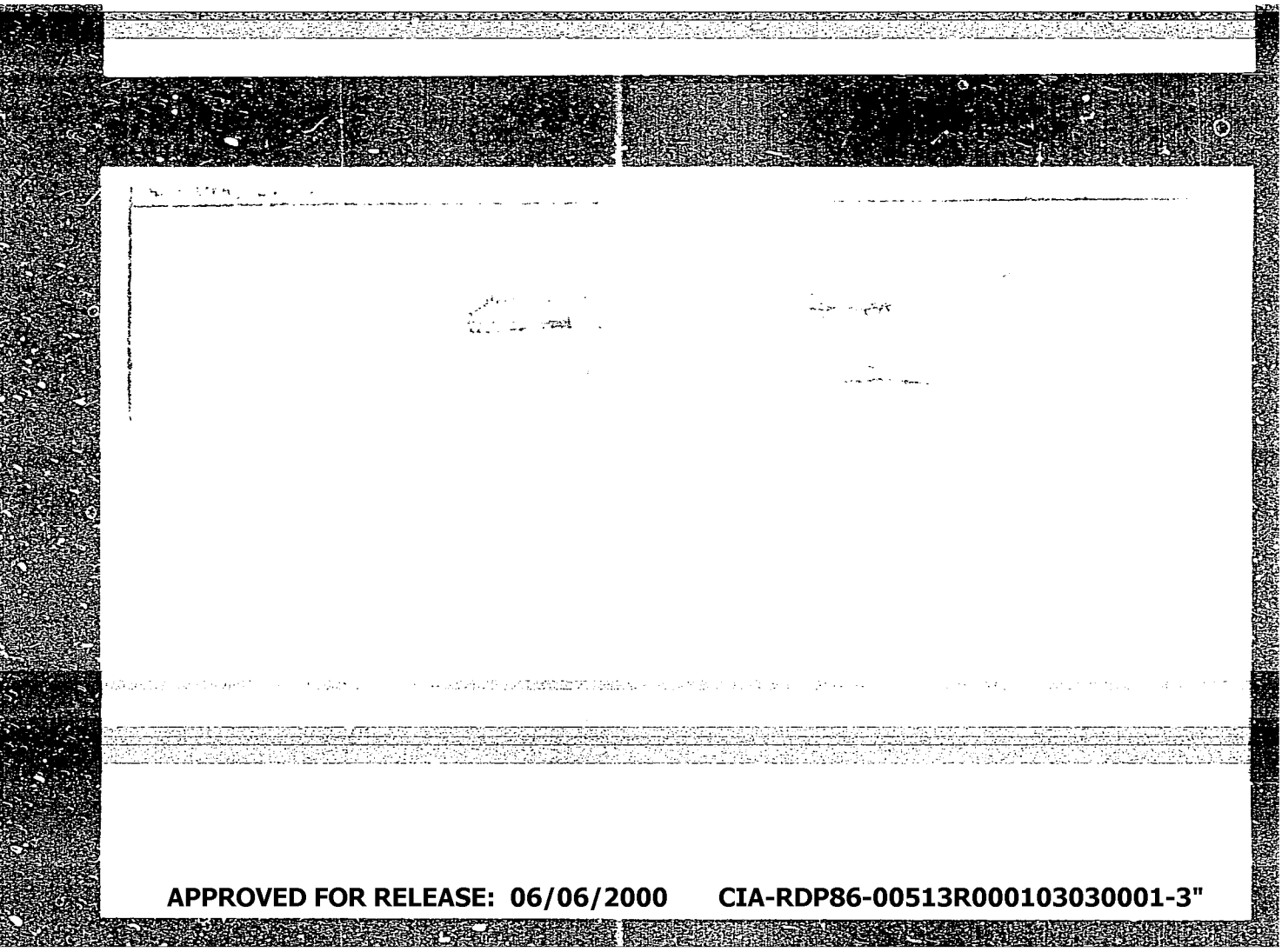
Bakanova, Z. M., Mandel'baum, Ya. A. . .

1.0591, 1.4840; *Et, Et, Et*, 52.5, b_{9-11} 108–13°, 1.0301, 1.4807; *Et, Et, iso-Pr*, 65, b_{9-11} 112–20°, 1.1118, 1.4867; *iso-Pr, Et, iso-Pr*, 39.2, b_{9-11} 113–20°, 1.0560, 1.4820; *Bu, Et, iso-Pr*, 70.5, b_{9-11} 136–40°, 1.0718, 1.4890; *Bu, H, Et*, 80.6, b_{9-1} 100°, 1.2523, 1.5000. $(RO)_2P(S)SCHMeNR'$-CO_2R'': *Et, H, Et*, 44, b_{9-1} 74–83°, 1.1592, 1.4896; *iso-Pr, H, Et*, 39.6, b_{9-1} 90–3°, 1.1008, 1.4744; *iso-Bu, H, Et*, 43.3, $b_{9.5-9.4}$ 95–114°, 1.0845, 1.4906; *Me, Et, Et*, 25.4, b_1 70–1°, 1.1829, 1.4980; *Pr, Et, Et*, 18.8, b_{9-1} 75–85°, 1.0703, 1.4925; *iso-Pr, Et, Et*, 33, b_1 99°, 1.0793, 1.4780; *iso-Bu, Et, Et*, 61, b_{9-1} 92–103°, 1.0554, 1.4855; *Me, Et, iso-Pr*, 30, b_{9-1} 65–75°, 1.0595, 1.4973. The substances are said to be weak contact insecticides, but unspecified ones have fairly strong systemic activity. G. M. Kosolapoff

2/2

BAKANOVA, Z. M.

Organic pesticides. XXI. Synthesis of mixed esters of phosphorodithioic acid. [illegible] Vladimirova and N. N. Mel'nikov. XXII. Reactions of dialkyl phosphorochloridothioates with p-nitrophenol in presence of pyridine hydrochloride. Z. M. Bakanova, [illegible] and N. N. Mel'nikov. XXIII. Preparation of dialkyl[illegible] phates. N. N. Mel'nikov, Ya. A. Mandel'baum, [illegible] Z. M. Bakanova. XXIV. New method of preparing [illegible] esters of phosphonic acids. L. G. Vol'fson, [illegible] Mel'nikov and L. M. Kubleva. XXV. Synthesis of [illegible] esters of phosphorothioic acid. Ya. A. Mandel'baum, [illegible] [illegible] Lomakina. Zh. obshch. Khim. 1956, 26 [illegible] 2577, 2577 [illegible] 2579 2581, 2581--2583 [illegible] compounds, of which some are claimed to be [illegible] are synthesized by [illegible] different unsat[illegible] [illegible] with dialkyl [illegible] ates. II [illegible] esters of phospho[illegible] [illegible] esters of chlor [illegible]



BAKANOVA, Z.M.

MEL'NIKOV, N.N.; MANDEL'BAUM, Ya.A.; SVENTSITSKIY, Ye.I.; BAKANOVA, Z.M.

On organic insectofungicides. Part 27: New method for the preparation of esters of chlorothiophosphoric acid. Zhur.ob.khim. 27 no.7:1908-1910 Jl '57. (MIRA 10:10)

1.Nauchnyy institut po udobreniyam i insektofungisidam.
(Insecticides) (Chlorothiophosphoric acids)

MEL'NIKOV, N.N.; MANDEL'BAUM, Ya.A.; SHVETSOVA, K.D.; BAKANOVA, Z.M.
LOMAKINA, V.I.; ZAKS, P.G.; MIL'SHTEYN, I.M.; POPOV, P.V.;
POKROVSKIY, Ye.A.; BOCHAROVA, L.P.; SEDYKH, A.S.; UKRAINETS, N.S.

Improved technology for producing thiophos, metaphos, chlorophos and other phosphorus organic insecticides and investigation of new insecticides and fungicides derived from the esters of phosphoric acids. [Trudy] NIUIF no.164:11-14 '59. (MIRA 15:5)
(Insecticides) (Fungicides)

5 (3)

AUTHORS: Mandel'baum, Ya. A., Mel'nikov, N. N., Bakanova, Z. M. SOV/79-29-4-25/77

TITLE: From the Field of Organic Insecticides and Fungicides (Iz oblasti organicheskikh insektofungitsidov). XLI. On the Reaction of Dialkyl-chloro-thiophosphates and Thiophosphorus-trichloride With Phenols in the Presence of Tertiary Amines (XLI. O vzaimodeystvii dialkilkhlortiofosfatov i tiotrekhkhloristogo fosfora s fenolami v prisutstvii tretichnykh aminov)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 4, pp 1149-1151 (USSR)

ABSTRACT: In connection with the papers mentioned in the references 1-5 the authors especially investigated the reactions of dialkyl-chloro-thiophosphates with phenols in the presence of tertiary amines. This reaction proceeded already at room temperature in good yields and produced the corresponding dialky-aryl-thiophosphates. The solvents were of no importance, and the reaction proceeded also without solvents, but in this case the stirring of the reaction mixture is difficult owing to the crystallization of ammonium chloride.

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From the Field of Organic Insecticides and Fungicides. XLI. On the Reaction of Dialkyl-chloro-thiophosphates and Thiophosphorus-trichloride With Phenols in the Presence of Tertiary Amines

SOV/79-29-4-25/77

Dialkyl-aryl-thiophosphates are obtained in good yield also in alcoholic solution, which indicates that the reaction with phenols proceeds more rapidly than with alcohols. The authors investigated the reaction of dialkyl-chloro-thiophosphates with phenols in the presence of triethyl amine. O,O-dialkyl-O-aryl thiophosphates were found to result. The mechanism of the formation of dialkyl-aryl-thiophosphates from dialkyl-chloro-thiophosphates and phenols in the presence of tertiary amines can be best explained in the following way: There is an exchange reaction between amine phenolate and dialkyl-chloro-thiophosphate, yielding the hydrogen chloride of the amine and of dialkyl-aryl-thiophosphate. On the reaction of phenols with thiophosphorus trichloride in the presence of triethylamine aryl-dichloro-thiophosphates were obtained in sufficient yield. There are 1 table and 5 references, 4 of which are Soviet.

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From the Field of Organic Insecticides and Fungicides. XLI. On the Reaction of Dialkyl-chloro-thiophosphates and Thiophosphorus-trichloride With Phenols in the Presence of Tertiary Amines SOV/79-29-4-25/77

ASSOCIATION: Nauchnyy institut po udobreniyam i insektofungitsidam (Scientific Institute of Fertilizers, Insecticides and Fungicides)

SUBMITTED: March 12,1958

Card 3/3

5.1320,5.3630

77380
SOV/79-30-1-41/78

AUTHORS: Mandel'baum, Ya. A., Mel'nikov, N. N., Bakanova, Z. M.

TITLE: Concerning Organic Pesticides. LII. Concerning the Reaction of Aryl-Dichlorothiophosphates With Magnesium Ethoxide

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol 30, Nr 1, pp 194-197 (USSR)

ABSTRACT: The reaction of aryl dichlorothiophosphates with magnesium ethoxide was investigated with the purpose of obtaining some new pesticides, and also in order to study the relationship between the reactivity and the structure of the chlorothiophosphoric acid derivatives. The reaction can proceed according to (1), (2), and (3), depending on the ratio of the reagents, the temperature of the reaction, and the time of reaction.

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Concerning Organic Pesticides. LII. Concerning the Reaction of Aryl-Dichlorothiophosphates With Magnesium Ethoxide

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SOV/79-30-1-41/78

$$2\,ArOPSCl_2 + (C_2H_5O)_2Mg \longrightarrow 2\,ArO\diagdown\!\!\diagup C_2H_5O\,PSCl + MgCl_2 \qquad (1)$$

$$2\,ArO\diagdown\!\!\diagup C_2H_5O\,PSCl + (C_2H_5O)_2Mg \longrightarrow 2\,ArOPS(OC_2H_5)_2 + MgCl_2 \qquad (2)$$

$$2\,ArOPS(OC_2H_5)_2 + (C_2H_5O)_2Mg \longrightarrow 2\,(C_2H_5O)_2PS + (ArO)_2Mg \qquad (3)$$

Aryl dichlorothiophosphates and magnesium ethoxide taken in stoichiometric amounts gave chiefly alkyl aryl chlorothiophosphates or the corresponding diethyl aryl thiophosphates. Transesterification (Formula 3) occurred only with large excess of magnesium ethoxide and on prolonged heating. Accordingly, 0.1 mole phenyl dichlorothiophosphate and 0.05 mole magnesium ethoxide on heating for 3.5 hr gave O-ethyl O-phenyl chlorothiophosphate (yield 64%; bp 95-100° C/0.2 mm). The same reagents taken in amounts of 0.05 mole and 0.1 mole, respectively, gave on heating for 7 to 17 hr O,O-diethyl O-phenyl thiophosphate (yield 82-91%; bp 120-122° C/0.8 mm). 0.1 Mole 2,4,5-trichlorophenyl

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Concerning Organic Pesticides. LII. Concerning the Reaction of Aryl-Dichlorothiophosphates With Magnesium Ethoxide

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SOV/79-30-1-41/78

dichlorothiophosphate and 0.3 mole magnesium ethoxide on heating at 65-70° C for 18 hr gave O,O-diethyl O-2, 4,5-trichlorophenyl thiophosphate (yield 78%; bp 130° C/ 0.13 mm); also, 2,4,5-trichlorophenol (yield 13%; mp 62° C), and triethyl phosphate (yield 15%). Under similar conditions, 0.1 mole 4-nitrophenyl dichloro-thiophosphate and 0.3 mole magnesium ethoxide gave O,O-diethyl-O,4-nitrophenyl thiophosphate (yield 40%; bp 156-158° C/0.3 mm); also, p-nitrophenol (yield 28%; mp 112° C), and O,O,O-triethyl thiophosphate (yield 30%; bp 51-52° C/0.3 mm). There are 10 references, 2 U.S., 1 U.K., 7 Soviet. The U.S. and U.K. references are: H. D. Orloff, C. J. Worrel, F. X. Markley, J. Am. Chem. Soc., 80, 727 (1958); R. F. Hudson, L. Keoy, J. Chem. Soc., 1953, 2463; T. R. Fukuto, R. L. Metcalf, J. Agr. Food Chem., 4, 930 (1956).

Card 3/4

Concerning Organic Pesticides. LII. Concerning the Reaction of Aryl-Dichlorothiophosphates With Magnesium Ethoxide

77380
SOV/79-30-1-41/78

ASSOCIATION: Scientific Institute for Fertilizers and Pesticides (Nauchnyyyinstitut po udobreniyam i insektofungitsidam)

SUBMITTED: January 5, 1959

Card 4/4

MANDEL'BAUM, Ya.A.; MEL'NIKOV, N.N.; BAKANOVA, Z.M.; ZAKS, P.G.

Organic insecticide-fungicides. Part 61: Synthesis of some mixed ethyl mercaptoethyl thiophosphates. Zhur.ob.khim. 31 no.12:3947-3949 D '61. (MIRA 15:2)

1. Nauchnyy institut po udobreniyam i insektofungitsidam im. Ya.V.Samoylova, Moskva.
(Phosphothioic acid)
(Insecticides)

MEL'NIKOV, N.N.; MANDEL'BAUM, Ya.A.; BAKANOVA, Z.M.

Organic insecticide-fungicides. Part 63: Synthesis of some derivatives of phosphinic acids. Zhur.ob.khim. 31 no.12:3953-3955 D '61. (MIRA 15:2)

1. Nauchnyy institut po udobreniyam i insektofungitsidam imeni Ya.V. Samoylova, Moskva.
(Phosphinic acid)
(Insecticides)

ACCESSION NR: AP[illegible]

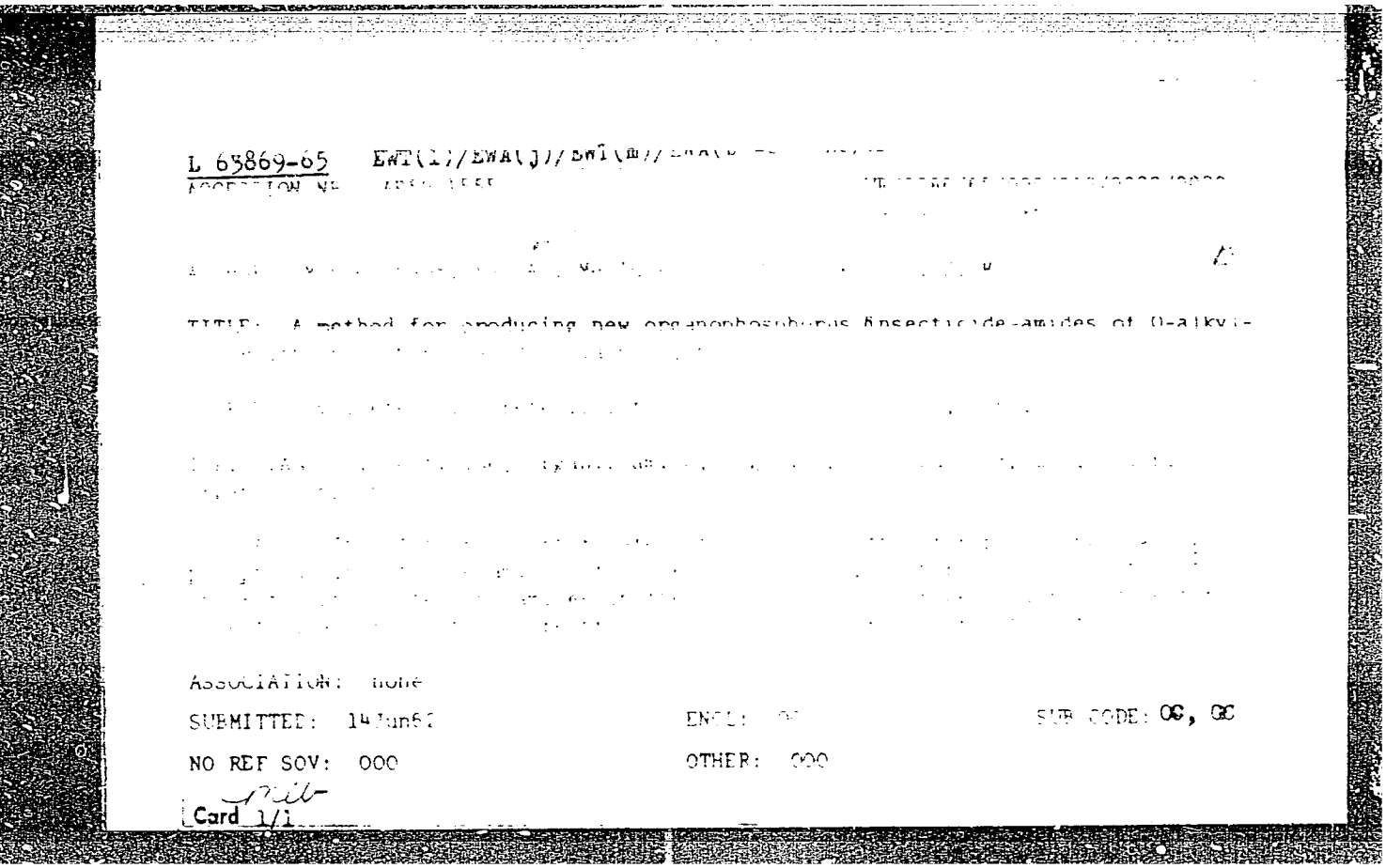
organic compound

ABSTRACT: This Author's Certificate introduces a method for producing new organo-

SUBMITTED: 14Jun62 ENCL: 00 SUB CODE: OC, GC

NO REF SOV: 000 OTHER: 000

Card 1/1



L 63869-65 EWT(l)/EWA(j)/EWT(m)/...

ACCESSION NR: ...

TITLE: A method for producing new organophosphorus insecticide-amides of O-alkyl-...

ASSOCIATION: none

SUBMITTED: 14Jun63 ENCL: 00 SUB CODE: OC, OC

NO REF SOV: 000 OTHER: 000

Card 1/1

L 1687-66 EWT(l)/EWT(m)/EPF(n)-2/EWG(m)/EPA(w)-2/EWP(t)/WP(b) IJP(c) JD/AT

ACCESSION NR: AP5020552 UR/0294/65/003/004/0520/0523

AUTHOR: Bakanovich, G. I.; Grechikhin, L. I.

TITLE: Use of emission spectra of the copper atom for diagnostics of a plasma

SOURCE: Teplofizika vysokikh temperatur, v. 3, no. 4, 1965, 520-523

TOPIC TAGS: plasma diagnostics, emission spectrum, copper, Stark effect, Van der Waals equation, electrodes, plasma charged particle

ABSTRACT: Since copper pairs formed by erosion of electrodes exist in all types of plasma apparatus (plasmatrons, magnetohydrodynamic generators, arcs, etc.) the work described in the article is aimed at selection of the corresponding spectral lines, at fixing their basic constants (transition probability and the Stark and van der Waals constants) at evaluating the effect of various factors on the width of the selected lines, and at explaining errors in the measurement of temperature and concentration of the charged particles. The experiments were carried out with a direct current arc (i = 8 amp) between copper or brass electrodes under

Card 1/2